

The Rabies Reporter

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The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Rabies Research Unit of the Ontario Ministry of Natural Resources; the Rabies Laboratory at the Ottawa Laboratory (Fallowfield) of the Canadian Food Inspection Agency; the Ontario Ministry of Health; and the Geographic Information Systems Laboratory at Queens University, Kingston. Articles for future issues will be welcomed by the editor. The Rabies Reporter is not refereed, and should not be cited in papers intended for refereed journals. Send contributions, letters and inquiries to:

The Rabies Reporter
Rabies Research &
Development Unit
Ontario Ministry of Natural
Resources
Trent University—DNA Bldg.
2140 East Bank Drive
Peterborough, ON K9J 7B8

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rabies.mnr.gov.on.ca

Rabies During the Second Quarter

The low incidence of rabies exhibited in the first quarter continued throughout the second quarter. There were only 20 confirmed cases in the second quarter bringing the total so far to 31 cases. The only year which had fewer cases at the end of the second quarter was 1998—the year prior to the incursion of mid-Atlantic raccoon strain rabies. In fact, this is only the fifth year to have fewer than 50 cases at the end of the first six months.

The seasonal increase in rabid bats began with nine new cases bringing the total to 12. This is down slightly from 2005 when there were 15 cases. The cases were scattered throughout southern Ontario.

There were also an additional eight rabid skunks this quarter including one in Simcoe County, one in Wellington County, two in Huron County, one in Waterloo Region, and three in Peel. This is down one case from 2005; however, the cluster of cases have moved southward from Simcoe County into Wellington, Waterloo, and Peel.

Two of the rabid skunks were located in the Bolton area. Bolton is near the edge of the aerial rabies vaccination zone. As a result of these cases, baits will be distributed by hand and by helicopter throughout the ravine systems in Toronto. Hand distribution of baits will occur in August and the remainder of the ravines will be aerially baited in early October. Handbaiters will include volunteers from Earthrangers and from the Metro Toronto Region Conservation Authority. They will distribute baits in the ravines closest to Pearson International Airport.

The rabid skunk from Wellington County was infected with ERA strain rabies. This is a vaccine-induced case of rabies from our rabies vaccine baits. The risk of vaccine-induced rabies is very low. Since aerial baiting began in 1989, over 14,000,000 ERA vaccine baits have been

distributed and this is only the tenth case of vaccine-induced rabies. Vaccine-induced rabies is more likely to occur in immuno-compromised and juvenile animals. The other cases were discovered in skunks (2), foxes (4), raccoons (2), and bovine (1).

There was also a rabid sheep and a rabid bovine in Wellington County. These animals were likely infected by rabid skunks.

There was one rabid raccoon in Grey County. This animal was infected with the Arctic fox strain of rabies.

There have not been any confirmed cases of raccoon strain rabies in Ontario since September 2005. Aerial baiting and trap-vaccinate-release programs will continue in southeastern Ontario to contain any cases which may remain in the area.

To help combat the persistence of rabid skunks in southwestern Ontario, the Rabies Research and Development Unit will be distributing a new oral rabies vaccine, ON-RAB, targeting skunks in selected areas of southwestern Ontario. ONRAB is a genetically modified vaccine which can not cause vaccine-induced rabies.

ONRAB will be incorporated in a new, smaller bait (ultra-lite) especially designed for skunks. This new vaccine-bait combination may help eliminate the remaining pockets of Arctic strain rabies which have persisted in southwestern Ontario. This bait uses the same attractant that is currently used for raccoons and foxes so it will be attractive to the three wildlife species (vectors) most responsible for transmitting rabies.

Terrestrial rabies cases are usually highest during the first two quarters of the year due to the increased transmission during reproduction. Depending on the incidence of rabid bats, 2006 could very well be a record year for fewest number of confirmed cases.

Beverly Stevenson
RRDU
Peterborough, ON

Trap-Vaccinate-Release Program Celebrates 20th Year

The 2006 field season will mark the 20th year of operation for the Rabies Research and Development Unit's Trap-Vaccinate-Release (TVR) program. The program consists of setting live traps to capture raccoons and skunks, vaccinating intramuscularly, ear tagging, sexing, aging and releasing at the site of capture. By vaccinating a significant portion of the raccoon and skunk population, the virus is unable to spread effectively, and will ultimately die out. By protecting a few small populations along the Ontario – New York border (the area believed to be most susceptible), MNR has been able to protect the entire provincial populations of rabies vector species and therefore Ontario's livestock, pet, and human populations. Since the inception of the TVR program over 86,000 raccoons and 7,000 skunks have been vaccinated.

The TVR program began as an experimental project in Scarborough in 1987. After proving to be successful, it was implemented in the Niagara frontier in 1994, as the risk of rabies entering Ontario was greatest in this area due to the proximity of cases in New York State. The objective of the TVR program was to prevent a strain of rabies known as mid-Atlantic raccoon strain rabies from entering Ontario from New York State.

In the 1970s, it is believed that raccoon hunters from Virginia, trying to improve their hunting stock,

imported raccoons from Florida to Virginia and inadvertently relocated this strain of rabies. While this strain had been slowly spreading northward in Florida, it quickly spread in Virginia to neighboring states.

By the 1980s, the virus was spreading northward at an average rate of 40-60 km per year. New York State was first infected in 1990, and within four years, the state had discovered 5,785 confirmed cases of raccoon rabies. As Ontario did not want to incur the

massive costs associated with this infection in the USA, the Rabies Research and Development Unit

was tasked to stop this invading virus from entering Ontario. By using our unique geography of the Great Lakes which straddles the ON-NY border, a TVR barrier of immunized raccoons was developed along the border's weaknesses at the Niagara and St Lawrence Rivers. Although these rivers are wide and swift and pose a formidable challenge for raccoons to traverse, many bridges span the rivers, and raccoons have also been known to use ice dams, boat traffic, transport trailers, and island hopping to cross these rivers in the past.

The first TVR program was implemented in Niagara peninsula in 1994, between the Niagara River and the Welland Canal. The following year, a second TVR program was implemented along the St Lawrence River from Kingston



Figure 1. Raccoons waiting to be vaccinated, ear-tagged and released at the point of capture.

to Cornwall. Because of the great distance (180km), TVR was only implemented around the bridge crossings of the river and on the major islands of the St Lawrence. Areas covered by TVR are broken up into "trapping cells" which are 10km² in rural areas and 2-3 km² in urban areas. Each trapper sets 100 live traps at the beginning of the week, checks the traps daily, and vaccinates rabies vector species throughout the week. Over the past 13 years, the TVR program has used 1.1 million trap nights to vaccinate over 90,000 animals.

The raccoon rabies virus reached the Ontario border in Niagara in 1995 and has been successfully kept from entering Ontario in this area to date. In eastern Ontario, the raccoon virus was able to cross the more difficult to protect St Lawrence River and the first case of raccoon rabies ever diagnosed in Canada was confirmed near Brockville in July 1999. Unlike the viruses' rampant history in NY State where there were 8,587 confirmed cases of raccoon rabies within the first seven years, Ontario aggressively sought to contain the disease and have had only a total of 132 cases of raccoon rabies in the seven years since the initial case. In the past two years, only five cases have been confirmed, with the last one occurring in September 2005.

Once aerial vaccine baiting strategies are successfully able to push the virus further south of Ontario's borders, TVR may only be necessary in the event of an unexpected outbreak. In 2006, the TVR program will continue to play a vital role in the ongoing effort to keep the raccoon rabies virus out of Ontario.

*Tore Buchanan
RRDU
Peterborough, ON*

Ohio Spring ORV Program

On April 18, 2006, Twin Otter C-GOGC headed to the Youngstown-Elser Airport in Ohio to participate in the 2006 Spring ORVP. MNR staff included pilots Dean Gill and Frank Aquino, AME Bob Everatt and rabies technician Kim Bennett. Despite technical difficulties with the baiting machinery, the project was completed in two days.

This program, (co-ordinated by the Ohio Department of Health, Ohio Department of Natural Resources and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service-Wildlife Services), in conjunction with Ohio's fall ORV program are intended to help

curb the spread of raccoon rabies which was identified in July 2004 in Lake, Geauga and Cuyahoga counties, west of an immune barrier established by regular rabies vaccination that began in 1997. This barrier has been successful in slowing the spread of raccoon rabies from Pennsylvania and West Virginia into Ohio. A total of 34 raccoons tested positive for raccoon strain rabies in 2005. So far in 2006, only 2 rabid raccoons have been identified; one in Geauga county, the other from Lake county.

Rabies baits were distributed within a 1,149 square-mile area, all within the counties of Lake and Geauga and parts of Portage, Cuyahoga and Summit counties (see map). MNR was responsible for distributing almost 138,000 sachet baits containing V-RG in rural areas. Fishmeal polymer baits were also distributed by helicopter and ground crews in areas that are difficult to target by fixed-winged aircraft.

*Kim Bennett
RRDU
Peterborough, ON*

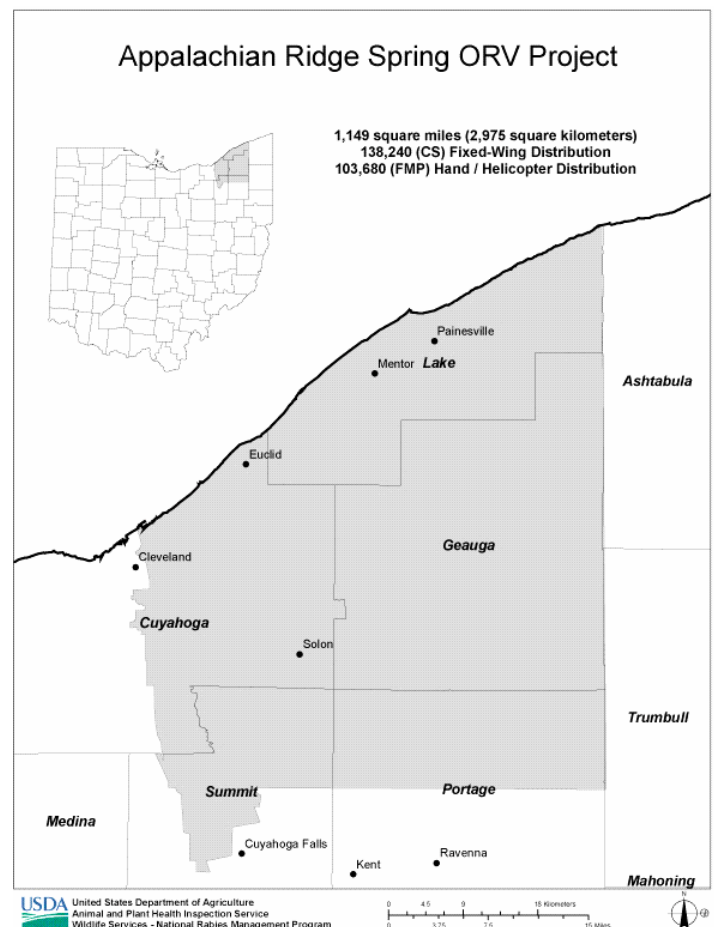


Figure 2. Area baited in Ohio in the spring of 2006. Baits contained VRG vaccine to control the raccoon strain of rabies.

Aerial Baiting - Process Monitoring and Control

The aerial baiting program introduced by Ontario's Ministry of Natural Resources (MNR) in the 80's has proven to be an extremely effective vaccination method, resulting in the near total eradication of rabies in wild animal populations in Ontario, and other regions of Canada and the USA, by the early 90's. In 2002, the MNR converted their aerial baiting operations to an automated process control and monitoring system with integrated GPS for aircraft navigation.

Prior to this new process control and monitoring system now deployed in all MNR aircraft for aerial baiting, the operation involved the entry of each flight into the ARNAV system which would direct the pilots to stay on course. The primary task

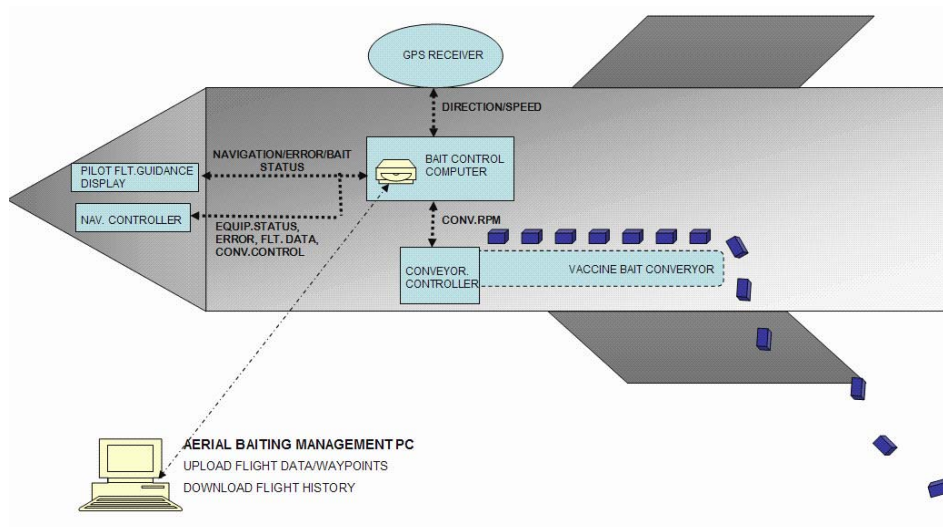


Figure 3. Automated bait delivery system developed by OES.

of the pilot and navigator was to fly and navigate the aircraft to the bait-

ing location or waypoint. Upon reaching this waypoint position, the pilot and navigator would have the additional task of controlling the bait discharge conveyor, adjusting the discharge rate for variations in air speed while maintaining course. The system worked surprisingly well, however automation of this process has significantly unloaded operational functions of the baiting system from the pilots and navigators enabling the bait system to perform automatically and more effectively.

"The new system replaces all manual functions and enables us to operate far more efficiently" says Andrew Silver, Rabies Research and Development Unit, MNR.

The flight planning software is now integrated with the process application software to control the complete system, providing real time feedback to pilots regarding flight guidance and operational status. The crew selects a flight plan and follows an indicator enabling the pilot to respond to course



Figure 4. Pilot guidance indicating course and distance to next waypoint.

and direction changes while the bait conveyor speed is automatically adjusted to ensure the drop rate is controlled.

While providing significant benefit to the pilots for operation of the aircraft and the baiting system, the process automation has enabled MNR to focus more on operations rather than function of equipment and manual recording.

"In the past, navigators were required to manually record data. Now, they are able to spend more time deciding where baits should be placed in specific areas improving our bait targeting accuracy. Also, if a pilot encounters bad weather on their selected flight, they can more easily switch to a different flight without returning to the airport," says Beverly Stevenson, Information Officer, Wildlife Research & Development, MNR

Most importantly, the baits are more accurately and uniformly distributed over large areas which ultimately improves the success of the program of regional baiting to vaccinate wild animals for the eradication of rabies.

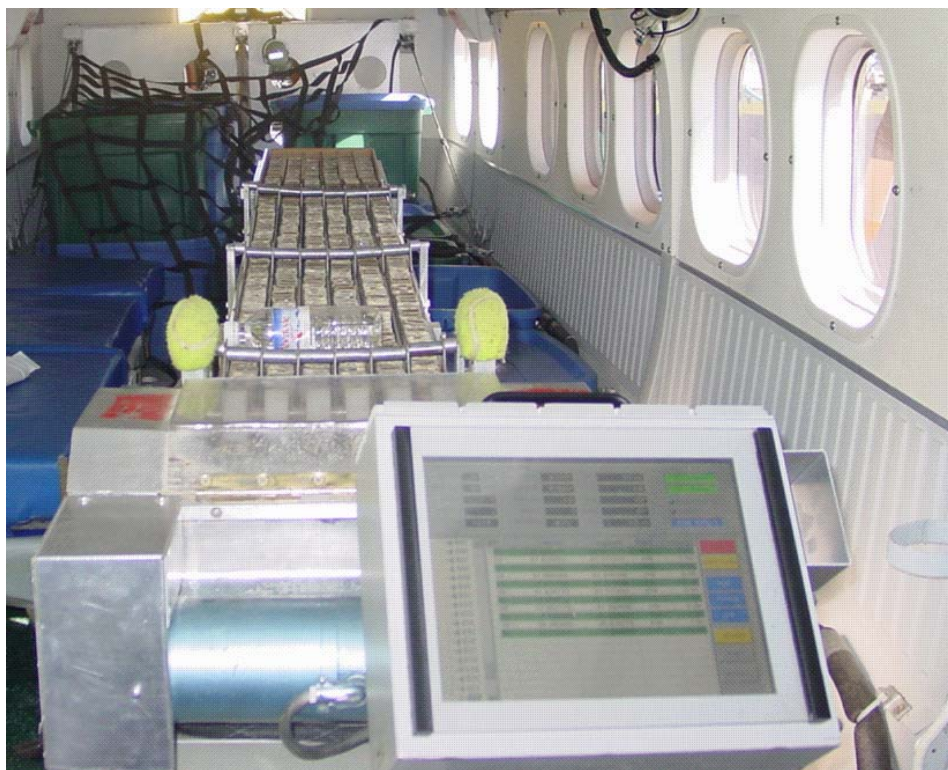


Figure 5. Bait discharge and conveyor.

OES is a solution provider of control and monitoring systems for mission critical applications with

core capabilities in electronic and software engineering. We are proud to have contributed to the success and effectiveness of this MNR program with the development and supply of the process automation system to optimize the distribution of rabies

vaccine baits.

This past year, the London Chamber of Commerce recognized OES as the runner-up Finalist for Product Innovation based on our submission of this project for the MNR.

Michael Reeve
Vice President
Market Development
OES, Inc.
London, ON

HOW TO REACH US:

Rabies Research and Development Unit
Ontario Ministry of Natural Resources
Trent University—DNA Building
2140 East Bank Drive
Peterborough, ON K9J 7B8
Canada

Office phone: 705-755-2272
Office fax: 705-755-2276
Email: beverly.stevenson@ontario.ca



Figure 6. Fox eating a rabies vaccine bait.

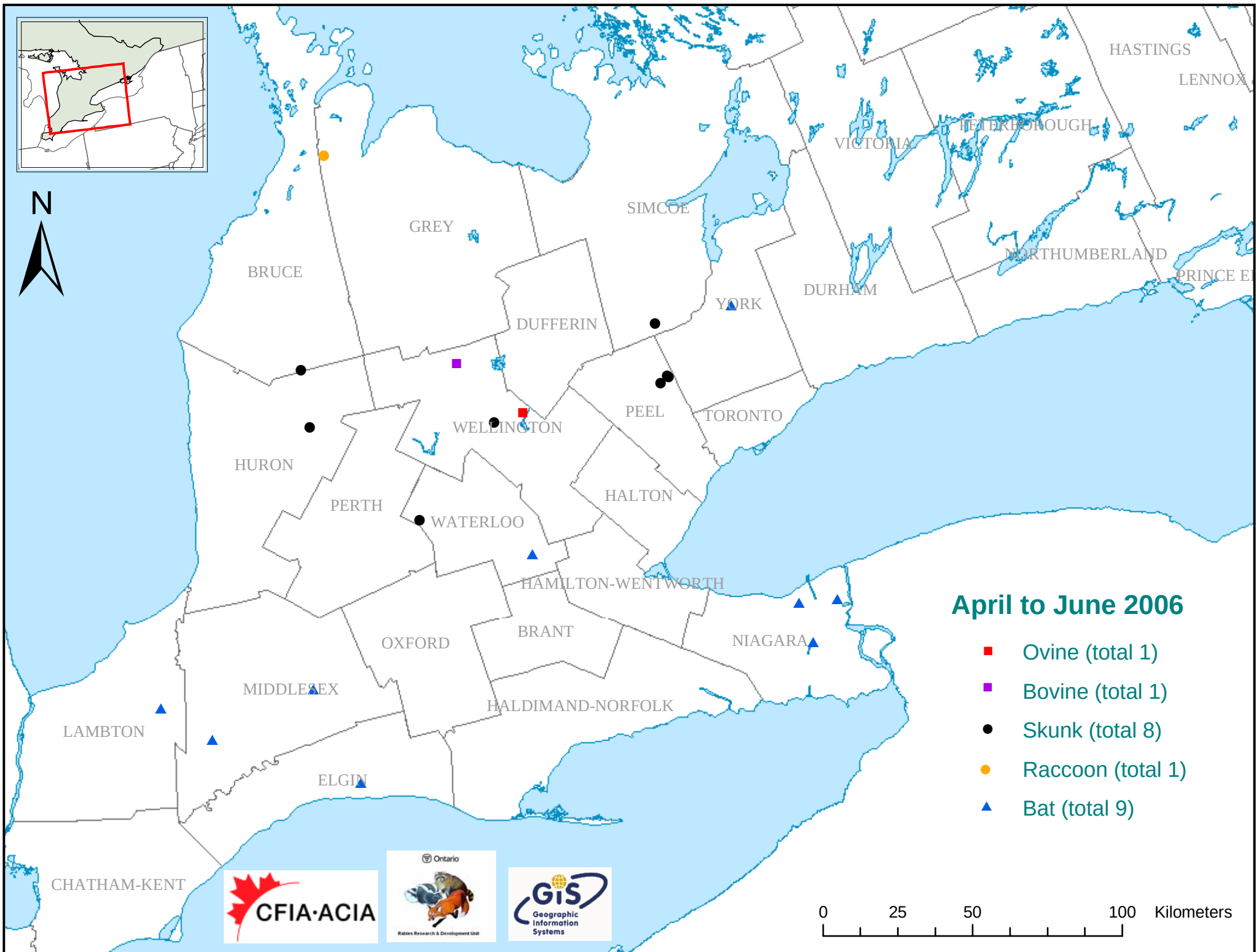
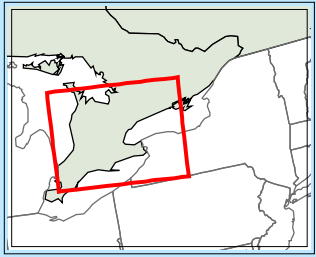
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Animal Rabies Report: April to June 2006

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		06	05		06	05		06	05		06	05		06	05		06	05		06	05		06	05			
Southern																											
Wentworth																								0	0	0	
Haldimand-Norfolk																								0	0	0	
Brant																								0	0	0	
Niagara												3	3	2										3	3	2	
Elgin												1	1											1	1	0	
Oxford														1										0	0	1	
Middlesex												2	2	1										2	2	1	
Lambton												1	1											1	1	0	
Kent																								0	0	0	
Essex																								0	0	0	
Northern																											
Muskoka																								0	0	0	
Parry Sound																								0	0	0	
Nipissing																								0	0	0	
Sudbury																								0	0	0	
Cochrane																								0	0	0	
Timiskaming																								0	0	0	
Algoma																								0	0	0	
Thunder Bay																								0	0	0	
Rainy River																								0	0	0	
Kenora																								0	0	0	
Regional Totals																											
Eastern	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Central	0	0	0	0	0	0	1	1	7	0	0	0	1	3	4	0	0	0	0	0	0	0	0	0	2	4	11
Western	0	0	1	1	1	1	7	12	7	0	0	0	1	2	4	0	0	1	0	0	0	2	5	9	11	20	23
Southern	0	0	0	0	0	0	0	0	0	0	0	0	7	7	4	0	0	0	0	0	0	0	0	0	7	7	4
Northern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	1	1	1	1	8	13	14	0	0	0	9	12	15	0	0	1	0	0	0	2	5	9	20	31	41

Notes for this quarter:

All bats were big brown bats. The livestock was one sheep and one cow. One skunk in Wellington County was infected with ERA strain rabies.



April to June 2006

- Ovine (total 1)
- Bovine (total 1)
- Skunk (total 8)
- Raccoon (total 1)
- ▲ Bat (total 9)



0 25 50 100 Kilometers